SSIM-R2-02/SSIM-R8-02
High Speed Token Ring
SmartStack Interface Modules

Installation
and
User Guide

CABLETRON SYSTEMS

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Manufacturer's Name:	**Cabletron Systems, Inc.**
Manufacturer's Address:	**35 Industrial Way** **PO Box 5005** **Rochester, NH 03867**
European Representative Name:	**Mr. J. Solari**
European Representative Address:	**Cabletron Systems Limited** **Nexus House,** **Newbury Business Park** **London Road, Newbury** **Berkshire RG13 2PZ, England**
Conformance to Directive(s)/Product Standards:	**EC Directive 89/336/EEC** **EC Directive 73/23/EEC** **EN 55022** **EN 50082-1** **EN 60950**
Equipment Type/Environment:	**Networking Equipment, for use in a Commercial or Light Industrial Environment.**

We the undersigned, hereby declare, under our sole responsibility, that the equipment packaged with this notice conforms to the above directives.

Manufacturer	Legal Representative in Europe
Mr. Ronald Fotino	Mr. J. Solari
Full Name	Full Name
Principal Compliance Engineer	Managing Director - E.M.E.A.
Title	Title
Rochester, NH, USA	Newbury, Berkshire, England
Location	Location

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1. Introduction

The SmartStack SSIM-R2-02 and SmartStack SSIM-R8-02 provide two ports of 100 Mbps High-Speed Token Ring for the SmartStack STS16-20RM Token Ring switch. Designed for high performance and low latency, these modules provide seamless integration between legacy Token Ring networks and HSTR servers or an HSTR backbone.

Note: References to STS16-20RM are also applicable to STS16-20FRM.

The SSIM-R2-02 offers UTP-5 copper connections with RJ-45 interface connectors. The SSIM-R8-02 offers multimode optical fiber connections with VF-45 interface connectors.You can mount either of them in one of the two front-panel expansion slots on the STS16-20RM switch.

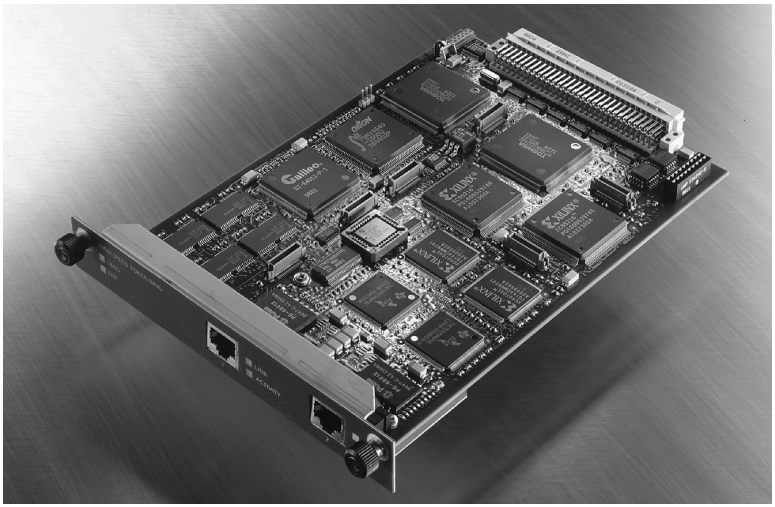

Figure 1. SSIM-R2-02 High-Speed Token Ring SmartStack Interface Module

The SSIM-R2-02 and SSIM-R8-02 conform to the IEEE 802.5t standard for 100 Mbps High-Speed Token Ring, and implement the standard DTR MAC protocol.

An HSTR port can connect to a standard HSTR adapter or it can act as a trunk port and carry traffic from up to 63 VLANs configured in the switch. This is achieved using standard IEEE 802.1Q VLAN frame tagging. For each VLAN a virtual port is created that behaves much like an ordinary Token Ring port.

The module enables standard Token Ring source routing and supports all the switching modes implemented in the switch.

Six LEDs on the front panel indicate the overall operational state of the module and the two ports. Configuration and detailed status information is available from the switch console or from the graphical management application.

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2. Installation

This chapter describes how to install, connect, and start using the SSIM-R2-02 or SSIM-R8-02. The following main topics are covered:

- Package Contents
- Installation Procedure
- Hardware Installation
- Software Installation
- Cabling
- LEDs
- Power-On Self Test
- Configuration

Package Contents

Your SSIM-Rx-02 package contains the following items:

- One SmartStack SSIM-R2-02 High-Speed Token Ring SSIM (UTP)
  OR
  one SmartStack SSIM-R8-02 High-Speed Token Ring SSIM (MMF).
- One *SSIM-R2-02/SSIM-R8-02 High-Speed Token Ring SmartStack Interface Module Guide to Operations* (this manual).

Installation Procedure

The SSIM-R2-02 and SSIM-R8-02 are packaged with software for both the module itself and the SmartStack Token Ring switch. The switch is also supplied with both software images. To ensure compatibility between the module and the switch, install the latest of the software versions.

The software for the switch and the module is also available via Cabletron's online services (Internet, FTP).

Install the module, as follows:

1. Install the software in the SmartStack Token Ring switch. See the switch manual for instructions on downloading the software.
2. Optional: Clear the NVRAM in the base switch. This will erase all configuration in the switch.

3. Reset the switch to activate the new software.
4. If you cleared NVRAM in step 2, re-establish the switch configuration. Verify that the switch is operating correctly.
5. Power off the switch

Warning: Be sure to install a version of the base switch software that supports the SSIM-Rx-02 (version 3.00 or later) **before physically inserting the** SSIM-Rx-02. Otherwise, the switch will not recognize it and this may in some cases corrupt the configuration.

6. Physically install the SSIM-Rx-02 in one of the two expansion slots. See section “Hardware Installation” on page 4 for detailed instructions.
7. Power on the switch.
8. Download the software for the SSIM-Rx-02. See section “Software Installation” on page 6 for detailed instructions.
9. If you plan to use the graphical switch manager application, install it now.
10. If necessary, configure the module. For details, see the section “Configuration” on page 9 as well as Chapter 3, “Console Configuration”.

Hardware Installation

To install the SSIM-R2-02 and SSIM-R8-02 in a SmartStack STS16-20RM or STS16-20FRM switch:

1. Power off the base switch by unplugging the power cord from the power outlet. If the switch uses the optional SmartStack STS-PSU Redundant Power Supply Unit, unplug the connector from the base switch as well.
2. Select an empty expansion module slot in which to install the SSIM-Rx-02. You can install the module in either or both of the slots.
3. Loosen the two screws on the expansion slot cover plate and remove the cover See Figure 2. Keep the plate for use in the event that the expansion module is later removed.

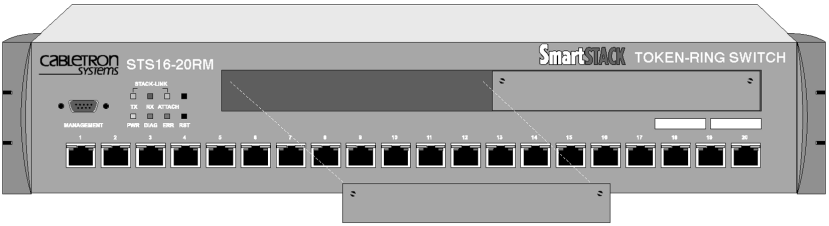


Figure 2. Removing the Expansion Slot Cover

Warning: Expansion modules are not hot-swappable. If you install or remove expansion modules while the power to the switch is on, damage may occur to the switch and to the module.

4. Carefully insert the SSIM-Rx-02 into the rails on each side of the expansion slot, and slide the module back until the connector on the module is seated into the connector at the back of the slot. See Figure 3. When the module is fully seated, the module faceplate will be flush with the front of the base switch.

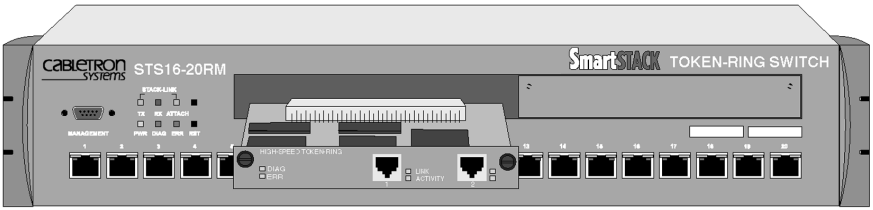


Figure 3. Inserting the Module

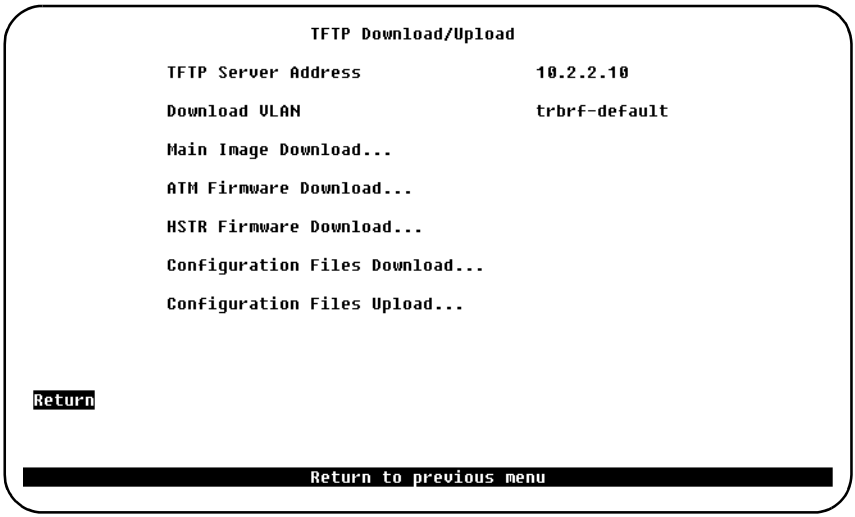
5. Secure the SSIM-Rx-02 with the two attached thumb screws.
6. Reapply power to the switch.

Software Installation

Before you can use your SSIM-Rx-02, you must install the SSIM-Rx-02 software image which you can download to the SSIM-Rx-02 via TFTP or via a serial line.

TFTP Download

1. On the disks supplied with the module, find the image file. The file name is of the form **HSTRyyzz.BIN** where yyzz is the version number of the software. For example **HSTR400.BIN** is version **4.00** of the software image.
2. Copy the software image file to a directory on the TFTP server.
3. On the main menu in the console, select **`Download/Upload`** to display the **`Download/Upload`** menu.
4. Select **`TFTP Download/Upload`** to display the **`TFTP Download/Upload`** menu:



5. On this menu, set the IP address of the TFTP server. Also, set the download VLAN (the BRF on which the TFTP server is located).
6. Select **`HSTR Firmware Download`** to display the **`HSTR Firmware TFTP Download`** screen.
7. Select **`HSTR Firmware Download Filename`** and type the filename of the software image to download.
8. Select **`Execute HSTR Image Network Download`** to start the download.

While the software is transferred over the network, the console will display

messages describing download activity. When the software has been transferred, you will see the following messages:

```
Network download complete.  Now transferring to HSTR
Module(s), please wait...

Download of HSTR firmware complete – HSTR module(s)
being reinitialized...
```

The software image is then programmed into the nonvolatile memory on the SSIM-Rx-02. When software installation is complete, the module starts for normal operation, and the following message is displayed:

```
Press <RETURN> to continue...
```

Serial Download

1. On the discs supplied with the module, find the software image file. The file name is of the form **HSTRyyzz.BIN** where yyzz is the version number of the software. For example **HSTR0310.BIN** is version **3.10** of the software image. Copy the software image file to a directory on the TFTP server.
2. From the main menu, select **`Download/Upload`** to display the **`Download/Upload`** menu.
3. Select **`Serial Link Download`**. The **`Serial Link Download`** screen is displayed.
4. Select **`HSTR Firmware Download`**.
5. Using your terminal software, transfer the software image to the module with the X-Modem protocol. The transfer will take some minutes depending on your terminal emulator baud rate.

The software image is then programmed into the FLASH memory of the module, and will remain there until it is replaced. When the software installation is complete, the module is started for normal operation, and the following message is displayed:

```
Press <RETURN> to continue...
```

Cabling

The cabling required depends on the version of the SSIM-Rx-02 you are installing.

SmartStack SSIM-R2-02 2-port High-Speed Token Ring SSIM (UTP5)

The UTP module uses standard UTP Category 5 copper cables. The maximum cable length is 100 m (328 feet).

1. Insert the modular RJ-45 jack from either end of a standard UTP-5 cable inton one of the connectors on the SSIM-R2-02 front panel.
2. Connect the other end of the cable to either another HSTR switch port (for example, another module) or an HSTR adapter.
3. If the default *Auto* port mode is in effect, the port will automatically open in the appropriate *Port* or *Station* mode. Refer to Chapter 3, “Console Configuration” for details on port mode configuration.

The SSIM-R2-02 also supports IBM type 1 STP copper cables (150 Ohm), which have a maximum length of 100m (328 feet). To use an STP cable, then balluns with an RJ-45 connector are required.

SmartStack SSIM-R8-02 2-port High-Speed Token Ring SSIM (MMF)

The MMF module uses multimode 62.5/125 micron fiber cables with a maximum cable length of 2000 m (6560 feet).

1. Connect a VF-45 optic fiber to the VF-45 connector on the front panel of the SSIM-R2-02. To ensure a proper connection, it may be necessary to clean the fiber connectors with a soft tissue dipped in alcohol.
2. Connect the other end of the cable to either another HSTR switch port (for example, another SSIM-Rx-02) or an HSTR adapter.
3. If the default *Auto* port mode is in effect, the port will automatically open in the appropriate *Port* or *Station* mode. Refer to Chapter 3, “Console Configuration” for details on port mode configuration.

LEDs

There are six LEDs on the front panel of the SSIM-Rx-02. During normal operation, the two LEDs on the left side of the front panel indicate the module status:

LED	Position	State	Meaning
DIAG (green)	Top	On	Diagnostics are in process.
		Off	No diagnostics are in process.
ERR (yellow)	Bottom	On	A module failure has occurred.
		Off	The module is working correctly.

Table 1. LEDs at the Left on the Front Panel

The two LEDs on the right of every port indicate the port status:

LED	Position	State	Meaning
LINK (green)	Top	On	The port has link and is inserted.
		Flashing	The port is disabled.
		Off	The port is not inserted.
ACTIVITY (green)	Bottom	Flashing	The port is receiving and/or transmitting LLC frames.
		Off	Currently no LLC traffic on the port.

Table 2. LEDs at the Right of Every Port

Power-On Self Test

When the switch is powered on, it will run a self test to ensure that all devices are working correctly. During this test, the switch will detect and start any SSIM-Rx-02s in its expansion slot.

The module will then perform an internal power-on self-test. The test takes a few minutes. During this time, the DIAG and ERR LEDs will remain lit and the other LEDs may turn on and off.

If the test reveals no problems, at the end of the test the DIAG and ERR LEDs will turn off and the module will enter its normal operation state.

If the test reveals a problem, at the end of the test the DIAG LED will turn off. Messages in the message log or on the console will describe the problem.

Configuration

The are two ways to manage SSIM-R2-02 and SSIM-R8-02*:*

- From the switch console, via Telnet or directly with a VT100 terminal emulator on the RS-232 port
- Through the SNMP-based graphical management application SmartStack Manager.
-

Chapter 3, “Console Configuration”, describes console comfiguration. The management application is described its online help.

All configuration parameters are stored by the switch and not by the module. This means that modules can be exchanged without reconfiguring the switch.

Note, however, that the SSIM-Rx-02 software image is stored on the module itself and will follow the module if you move it to another switch.

Default Configuration

When a SSIM-Rx-02 is inserted into an expansion slot for the first time, the switch will assume the default configuration. Each HSTR port:

- is enabled.
- is set to *Auto* mode.
- has one virtual port in the default CRF.

This configuration is suitable for connecting both HSTR adapters and other HSTR switch ports to the default CRF. If more advanced configurations are required, refer to Chapter 3, “Console Configuration” for details.

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3. Console Configuration

This chapter explains how to view and edit the configuration of the SSIM-R2-02 and SSIM-R8-02 using a VT100 terminal emulator attached directly to a SmartStack STS16-20RM switch. The SSIM-Rx-02 configuration can also be modified from a remote VT100 console via a Telnet session. Connecting a network management console is explained in the manual supplied with the SmartStack STS16-20RM switch.

The following topics are explained in this chapter:

- Introduction
- General Guidelines
- Configuration Overview
- Port Configuration—HSTR Ports
- Virtual Port Configuration

For more information on configuration, please see the *SmartStack STS16-20RM/ STS16-20FRM Token Ring Switch Installation and User Guide.*

Introduction

The SSIM-Rx-02 has two 100 Mbit HSTR ports. In the console configuration, port numbers are used to refer to ports, with the ordinary Token Ring ports being numbered 1 to 20. If the module is inserted into the left expansion slot, the HSTR ports are number 21 and 22. If the module is inserted into the right expansion slot, the HSTR ports are number 25 and 26. Any number of SSIM-Rx-02s may be inserted into a stack of Token Ring switches.

The HSTR ports are configured much like ordinary Token Ring ports, and generally appear in all tables where ordinary Token Ring ports appear.

Ports, Port Groups and VLANs

This section briefly describes the VLAN concept and switching modes of the SmartStack STS16-20RM Token Ring switch. For more information about these subjects, refer to the *SmartStack STS16-20RM Token Ring Switch Installation and User Guide.*

The SmartStack STS16-20RM Token Ring switch supports up to 63 VLANs. A VLAN forms a single bridged domain. The visibility of MAC addresses, bridge and ring numbers as well as the scope of broadcast frames are limited to the VLAN in which they origin. Frames must be routed to move between VLANs.

A VLAN consists of a number of port groups called a Concentrator Relay Function (CRFs). A CRF is conceptually equal to a ring. If a VLAN contains two or more CRFs they are conceptually connected by a multiport bridge called a Bridge Relay Function (BRF).

The BRF performs either Source-route bridging (SRB) or Source-route transparent (SRT) switching between the CRFs depending on the CRF configuration. The CRFs configured for SRT switching form a SRT domain, in which source-routed frames are source routed and non-source-routed frames are transparently switched.

Each ordinary Token Ring port is assigned to a specific CRF, which also determines which VLAN it belongs to.

HSTR Virtual Ports and VLAN Tagging

The HSTR ports behave much like ordinary Token Ring ports. They implement the DTR TXI MAC layer protocol as specified in the IEEE 802.5t specification and can be configured for *Port*, *Station* or *Auto* sensing modes. Also, before a port is inserted, the MAC layer protocol must complete the lobe test, which verifies the cable connection.

HSTR ports differ significantly from ordinary Token Ring ports, however, in that HSTR ports can function as trunk ports, which means that they can carry traffic belonging to all possible 63 VLANs over the same physical cable connection.

Frames from different VLANs are distinguished by means of standard IEEE 802.1Q frame tags. A frame tag consists of an 8-byte SNAP protocol header followed by a 2-byte Tag Control Information (TCI) field. It is inserted in the Token Ring frame after the route information field before transmission on HSTR and subsequently recognized and removed when the frame is received.

The TCI field identifies which VLAN the frame belongs to by means of a 12-bit VLAN identifier. This VLAN identifier uniquely identifies the BRF. It also contains a 3-bit priority field, which is described in section “Virtual Port Configuration” under subsection “FC Modification”.

Each HSTR port can be assigned to several CRFs, but there can only be one HSTR port per BRF/VLAN. A virtual port is created for each CRF to which the HSTR port is assigned. All virtual ports but one must be tagged. In other words, a single virtual port can be left untagged. Also see section “Virtual Port Configuration” on page 18.

Note that a HSTR port with a single untagged virtual port is functionally equivalent to an ordinary Token Ring port. This is also the default configuration, with the virtual port in trcrf-default.

Virtual Port Restriction

Note: A HSTR port can only have one virtual port in each VLAN.

This follows from the nature of VLAN tagging. It would not be possible to distinguish frames from two virtual ports in the same VLAN, since they would have the same VLAN identifier.

Ring Number Restriction

Note: All CRFs that a HSTR port has virtual ports in must have the same ring number.

Thus, the ring number is a per-port parameter and not a per-virtual port parameter. This convention will also be implemented by HSTR switches and is expected to be adopted by the IEEE. To see the importance of this, consider the implication of *not* having this restriction. If it was not in effect, the meaning of the RIF would be ambiguous and depend on to which VLAN the frame was sent. It would thus be incomprehensible to equipment that does not understand VLAN tags.

When a virtual port is created in a VLAN this restriction might in some cases require that a new CRF be created to avoid changing existing ring numbers.

General Guidelines

To work within the console menus, follow these guidelines:

- To select a menu item, use the arrow keys to move the “highlight” over the selection, then press Enter.
- If you need to specify additional information for any item—for example, selecting ***Yes*** or ***No*** or supplying a value—a prompt appears on the screen. If you want to exit the prompt without changing the value, press Esc.
- In most cases, new values are saved when you select **`Return`**.
- The term “More” means there is more information than what is displayed on that screen. Selecting **`More`** and pressing Enter displays the next screen of information. If the screen is a one-screen display, selecting **`More`** will update the screen.
- The term “Port” refers to the number of a specific port on a SmartStack STS16-20RM.
- “Index” refers to the numerical order of a list.
- To return to the main menu from any screen within the menus, press Ctrl-P. Note that any changes made to the screen you were in are not saved. To return to the greeting screen, press Ctrl-B from any screen.
- To refresh the console panel at any time, press Ctrl-L.
- If you are administering switches in a stack, many of the console screens will prompt for a box number. Enter the number of the box you want to administer to continue. The box that you are physically connected to is highlighted.

- The console automatically returns to the greeting screen after five minutes of inactivity. Five minutes is the default value. The time can be changed at the **`Console Configuration`** menu. The **`Console Configuration`** menu is within the **`Configuration`** menu, under the main menu.
- For protection against inadvertent or unauthorized access to configuration screens, you can set a password that users must enter at the Greeting screen. If no password is configured, just press `Enter` and the main menu is presented.

Navigating within the Menus

Use the arrow keys (also referred to as cursor keys) to move the highlight over a selection. If the selection is a menu, pressing the Enter key displays a new screen of information; if the selection is a command, such as **`Reset`**, pressing the Enter key initiates that function.

A heading with three “dots” after it means that when that heading is selected, a submenu or screen is displayed. Unless specified differently, all the screens or menus are accessed in the same way.

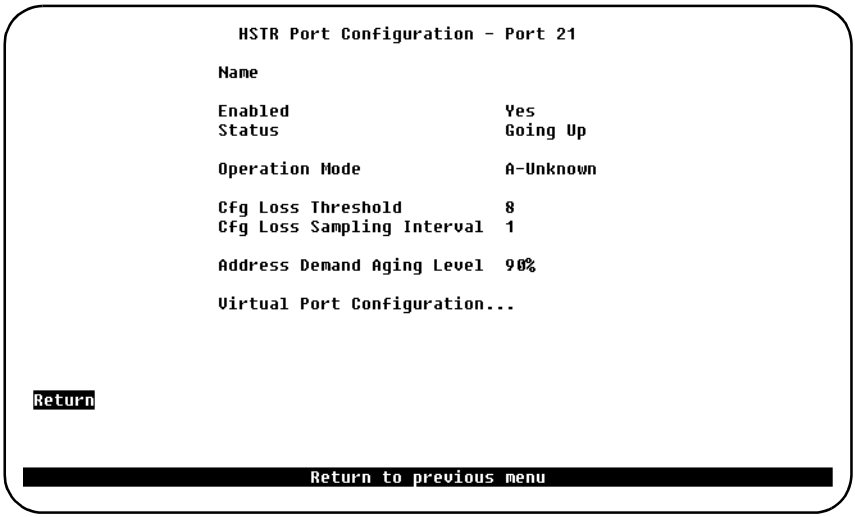
Configuration Overview

Execute the following general steps to configure a SSIM-Rx-02:

- Determine which VLANs the HSTR ports should connect.
- Determine which VLAN, if any, should be untagged.
- Configure the 802.1Q VLAN ID for all the BRFs that should be tagged.
- Make sure that each 802.1Q VLAN ID matches that of the HSTR equipment on the other end.
- Assign CRFs to the HSTR port, thereby creating one virtual port in each VLAN. You can create new CRFs to make sure that the CRFs do not have conflicting ring numbers, as discussed in “Ring Number Restriction” on page 14.
- Configure the HSTR port, in particular the operation mode.
- Configure the virtual ports, in particular the tagging mode. The relevant configuration menus are described in the port configuration sections.

Port Configuration - HSTR Ports

To configure an HSTR port on the SSIM-Rx-02, select **`Port Configuration`** from the **`Configuration`** menu and enter the port number of the HSTR port (21, 22, 25, or 26). The following menu appears:



The following items are shown:

Enabled

Detemines whether the port is enabled, Yes or No. When the port is disabled, the LINK LED will blink. This is also the case, if the port has been auto-disabled, see “Cfg Loss Threshold” and “Cfg Loss Sampling Interval” on page 17” .

Default: *Yes*.

Status

Display only. Shows the current status of the port. Can be one of the following:

Value	Meaning
Auto Disabled	The port has been auto disabled.
Down	The port has been disabled and the MAC protocol is disconnected.

Table 3. HSTR Port Configuration: Status Values

Value	Meaning
Going Up	The port is enabled and the MAC protocol is trying to connect.
Up	The port is up and the MAC protocol has connected.
Going Down	The port has been disabled and the MAC protocol is disconnecting.
Temporary Down	The MAC protocol has disconnected, but is actively trying to connect again. The disconnect reason might be a wire fault or configuration change.

Table 3. HSTR Port Configuration: Status Values

Operation Mode

Sets the operation mode of the port. Possible configured values are FDX port, FDX station and Auto. On an HSTR connection, one end must be a FDX port and the other a FDX station. An HSTR adapter is always a FDX station, where a switch port can be both. The Auto mode will attempt to detect the port mode automatically by switching between the two modes with a period of a few seconds.

When the port connects in the Auto mode, the detected mode is shown as A-FDX port or A-FDX station.

Default: *Auto.*

Cfg Loss Threshold

Sets the number of configuration losses before the port auto-disables. Possible values are 1 to 100 or Disabled. The MAC protocol generates a configuration loss in case of lobe test failure, heartbeat failure, address change or other MAC protocol error.

Default: *8*.

Cfg Loss Sampling Interval

Sets the sampling interval in which the Cfg Loss threshold must be exceeded for the port to auto disable. Possible values are 1 to 60 minutes.

Default: *1*.

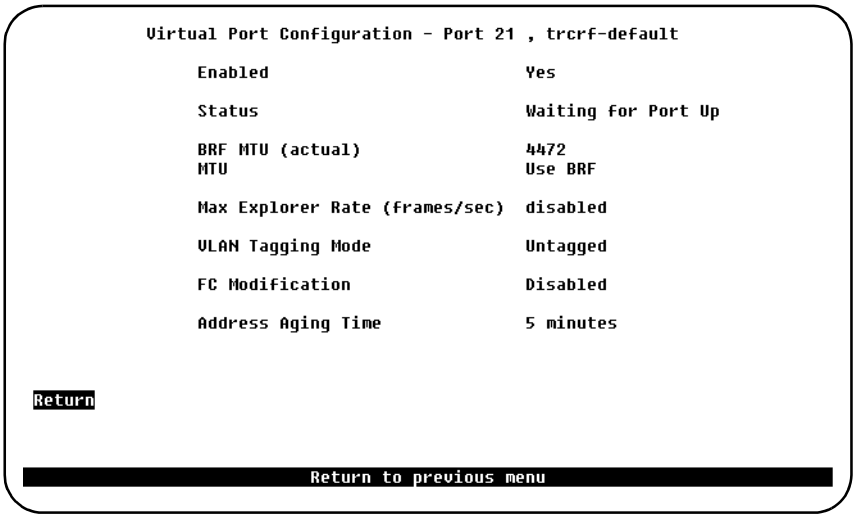
Address Demand Aging Level

Sets the threshold on the number of entries in the address table on which entries are aged faster. Possible values are 50, 60, 70, 80 and 90 percent and Disabled.

Default: *90 percent.*

Virtual Port Configuration

To configure a virtual port on an HSTR port select **`Virtual Port Configuration`** on the HSTR **`Port Configuration`** menu. If the HSTR port has more than one virtual port, a list of the corresponding CRFs appears from which the virtual port must be selected. The following menu appears:



Enabled

Sets the administrative state of the virtual port, possible values are *Yes* and *No*.

Default: *Yes*.

Status

Display only. Shows the current status of the virtual port. Can be one of the following:

Value	Meaning
Admin down	The port or virtual port is disabled.
Waiting for port up	The virtual port is waiting for the port to come up.
Up	The virtual port is up but not forwarding.
Forwarding	The virtual port is up and forwarding.

Table 4. Virtual Port Configuration: Status Values

Value	Meaning
Temporary down	The virtual port is currently down because the port is temporary down.

Table 4. Virtual Port Configuration: Status Values

MTU

Sets the maximum frame size for the virtual port, possible values are 1500, 4472, 8144, 17800, and Use BRF. These values correspond to the standard values used on the ordinary Token Ring ports. Actually, slightly larger frame sizes are allowed to accommodate the frame sizes defined by the ATM Forum LAN Emulation standard and implemented by the SmartStack SSIM-Ax-01 module. Also, the IEEE 802.1Q frame tag adds another 10 bytes to each frame.

Table 5 shows the configured and actual frame size, as well as the corresponding Largest Frame Size bits that are used in explorer RIF expansion:

MTU configured	Actual HSTR frame size	LF bits
1500	1558	001
4472	4556	011
8144	9246	100
17800	18202	110

Table 5. Virtual Port Configuration: Maximum Frame Size

Also shown is the actual MTU for the BRF. If Use BRF is selected, the BRF value will be used. Otherwise, the lowest of the BRF MTU and port MTU values will be used. Thus, a port will never have a higher MTU than its BRF.

Range: *1500*, *4472*, *8144*, *17800*, and *Use BRF*

Default: *Use BRF*.

Max Explorer Rate

Sets the maximum explorer frame rate. If enabled, this will limit the amount of explorer frames being forwarded from the HSTR side of the virtual port to the switch.

Range: *0* to *5000* frame/sec or *Disabled*

Default: *Disabled*.

VLAN Tagging Mode

Sets the VLAN tagging mode of the virtual port. As explained previously, one virtual port on each HSTR port can be untagged. All other ports must be tagged and each of these virtual ports must use a unique 802.1Q VLAN ID with the same physical port. The 802.1Q VLAN ID can be configured for the TrBRE configuration. Refer to the *SmartStack STS16-20RM Token Ring Installation and User Guide.* When configuring the Tagging mode and the 802.1Q VLAN ID, make sure that the same Tagging mode and 802.1Q VLANs are used at both ends.

Preferably, the VLAN which is expected to have the largest amount of traffic should be untagged, since VLAN tagging does impose a small overhead.

Default: *Untagged* (first virtual port)

Default: Tagged (following ports)

FC Modification

Enables or disables FC modification when a frame tag is removed, possible values are Enabled and Disabled. As discussed earlier a VLAN frame tag also contains a 3 bit priority field. If FC modification is enabled, the Token Ring frame priority in the FC byte is overwritten with the frame tag priority, if the frame tag priority is not equal to zero. If FC modification is disabled, the FC priority is left as it is, and the frame tag priority is discarded.

When the SSIM-Rx-02 inserts a frame tag in a frame, it always uses the FC priority as the frame tag priority, so for frames received from another module, this option makes no difference. Other devices, however, might require that the frame tag priority should take precedence, in which case FC modification should be enabled.

Default: *Disabled*.

Address Aging Time

Sets the aging time for addresses learned on an HSTR port. When there has been no activity on an address for the specified period of time it is deleted from the address tables.

Range *1* to *9999* minutes or *0* (for disabled).

Default: *5* minutes.

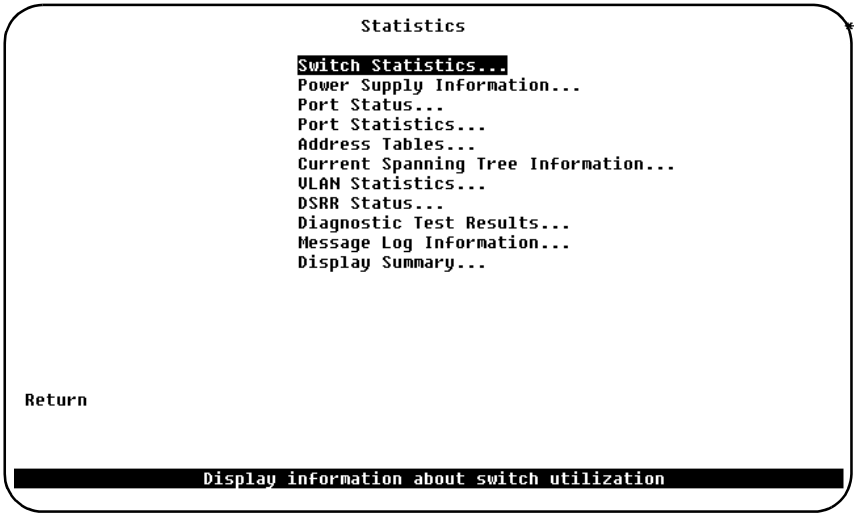
4. Statistics

A wide range of statistics is available for the SmartStack STS16-20RM Token Ring switch. The following topics are discussed in this chapter:

- Statistics Menu
- Port Status
- Port Statistics
- General Statistics
- Virtual Port Statistics
- 802.5 MAC Information

Statistics Menu

When **Statistics** is selected from the main menu, the following menu appears:



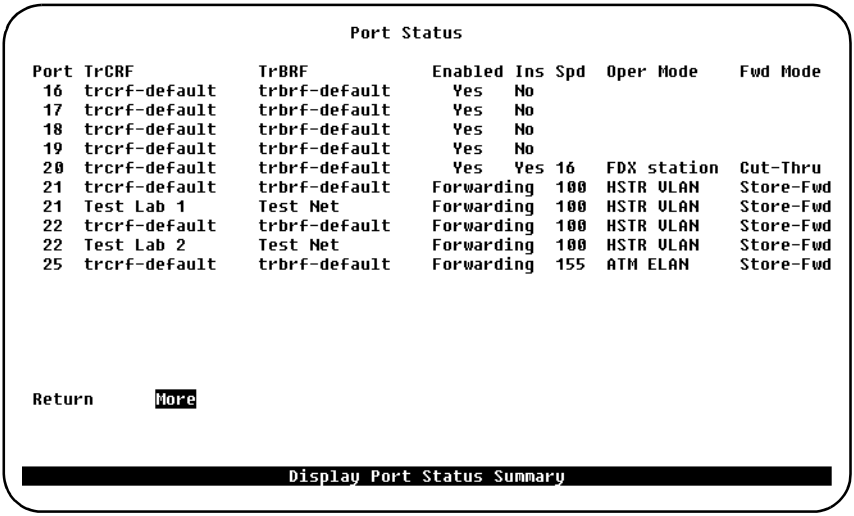
The commands in the **Statistics** menu are all described in the *SmartStack STS16-20RM Token Ring Switch Installation and User Guide*. For general information about these commands, refer to that manual.

Some commands, however, display additional information that is specific to the SmartStack SSIM-Rx-02 module:

- **Port Status**—includes SmartStack SSIM-Rx-02 virtual ports.
- **Port Statistics**—includes additional counters for HSTR ports.
- **Address Tables**—includes addresses learned from HSTR ports.
- **Message Log Information**—includes messages generated by the module.

Port Status

When **Port Status** is selected on the **Statistics** menu, a table similar to the following appears:


Port Status
Port TrCRF TrBRF Enabled Ins Spd Oper Mode Fwd Mode
16 trcrf-default trbrf-default Yes No
17 trcrf-default trbrf-default Yes No
18 trcrf-default trbrf-default Yes No
19 trcrf-default trbrf-default Yes No
20 trcrf-default trbrf-default Yes Yes 16 FDX station Cut-Thru
21 trcrf-default trbrf-default Forwarding 100 HSTR VLAN Store-Fwd
21 Test Lab 1 Test Net Forwarding 100 HSTR VLAN Store-Fwd
22 trcrf-default trbrf-default Forwarding 100 HSTR VLAN Store-Fwd
22 Test Lab 2 Test Net Forwarding 100 HSTR VLAN Store-Fwd
25 trcrf-default trbrf-default Forwarding 155 ATM ELAN Store-Fwd
Return
More
Display Port Status Summary

Besides the ordinary Token Ring ports, the table contains an entry for each HSTR virtual port, along with its current status. The following items are displayed:

Port

The HSTR port for which the virtual port is defined.

Range: 21, 22, 25, or 26.

TrCRF

The name of the CRF in which the virtual port is defined.

TrBRF

The name of the BRF in which the virtual port is defined.

Enabled/Ins

For ordinary Token Ring ports, this is the enabled and inserted status. This does not apply to virtual ports on an HSTR port. Instead the current state of the virtual port is displayed. Refer to the description of virtual port configuration for details.

Spd

The connect speed in Mbps, which is always displayed as 100 for HSTR virtual ports. Note that 100 Mbps full-duplex is the total bandwidth available on an HSTR port and is shared by all the virtual ports on that port. The actual bandwidth on a particular virtual port thus depends on the amount of traffic on other virtual ports.

Oper Mode

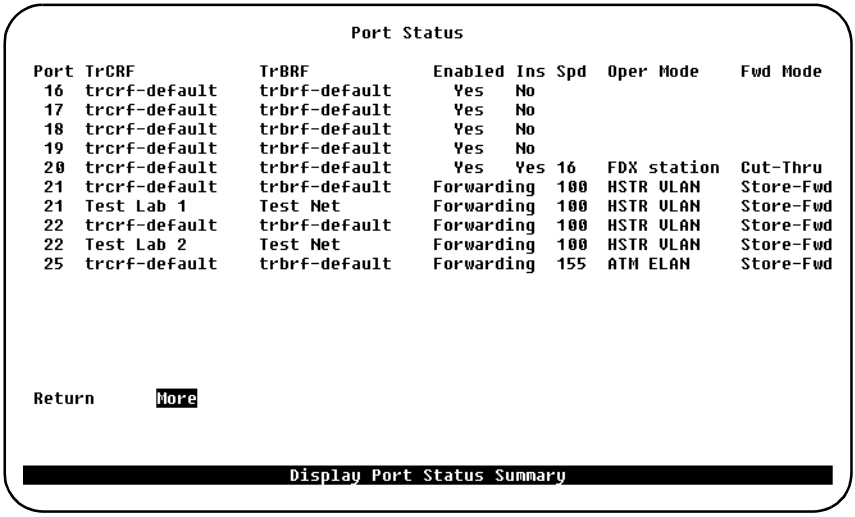
The operation mode is always displayed as HSTR VLAN for virtual ports.

Fwd Mode

The forwarding mode is always displayed as *Store-Fwd*, because the module always operates in the store-and-forward switching mode.

Port Statistics

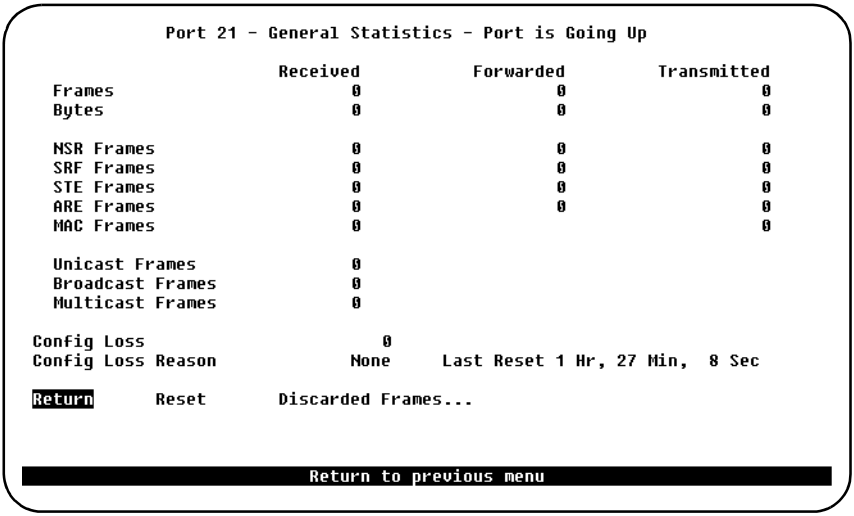
When **`Port Statistics`** is selected and the port number of an HSTR port is entered, the following menu appears:


Port Status
Port TrCRF TrBRF Enabled Ins Spd Oper Mode Fwd Mode
16 trcrf-default trbrf-default Yes No
17 trcrf-default trbrf-default Yes No
18 trcrf-default trbrf-default Yes No
19 trcrf-default trbrf-default Yes No
20 trcrf-default trbrf-default Yes Yes 16 FDX station Cut-Thru
21 trcrf-default trbrf-default Forwarding 100 HSTR VLAN Store-Fwd
21 Test Lab 1 Test Net Forwarding 100 HSTR VLAN Store-Fwd
22 trcrf-default trbrf-default Forwarding 100 HSTR VLAN Store-Fwd
22 Test Lab 2 Test Net Forwarding 100 HSTR VLAN Store-Fwd
25 trcrf-default trbrf-default Forwarding 155 ATM ELAN Store-Fwd
Return
More
Display Port Status Summary

The available information is discussed in “General Statistics”, “802.5 Statistics”, and “Virtual Port Statistics” sections.

General Statistics

When **General Statistics** is selected on the HSTR **Port Statistics** menu the following screen appears:


Port 21 - General Statistics - Port is Going Up
Received
Forwarded
Transmitted
Frames 0 0 0
Bytes 0 0 0
NSR Frames 0 0 0
SRF Frames 0 0 0
STE Frames 0 0 0
ARE Frames 0 0 0
MAC Frames 0 0
Unicast Frames 0
Broadcast Frames 0
Multicast Frames 0
Config Loss 0
Config Loss Reason None Last Reset 1 Hr, 27 Min, 8 Sec
Return Reset Discarded Frames...
Return to previous menu

The screen shows the number of frames and bytes received, forwarded, and transmitted on the HSTR port. These numbers include traffic for all virtual ports. The screen is automatically updated every 5 seconds.

Frame and Byte Counters

The following frame and byte counters are defined:

- **Received**
  Frames received from HSTR, but not necessarily forwarded.
- **Forwarded**
  Frames received from HSTR and forwarded to other ports in the switch.
- **Transmitted**
  Frames transmitted to HSTR.
- **Frames**
  The number of LLC frames received, forwarded, or transmitted. The number is subdivided into the NSR, SRF, STE, and ARE frames. For received frames it is also subdivided into unicast, broadcast and multicast frames. All are explained later in this table.

- **Bytes**
  The total number of bytes in the LLC frames received, forwarded, or transmitted. The byte count includes all bytes from AC up to and including the FCS field. Note that the forwarded byte count can be lower than the received byte count even though all frames are forwarded. This is because the VLAN frame tag is removed before a frame is forwarded.
- **NSR Frames**
  Number of Non-Source Routed frames.
- **SRF Frames**
  Number of Specifically Routed Frames.
- **STE Frames**
  Number of Spanning Tree Explorers.
- **ARE Frames**
  Number of All-Routes Explorers.
- **MAC Frames**
  Number of MAC frames.
- **Unicast Frames**
  Number of frames with a unicast MAC address as destination.
- **Broadcast Frames**
  Number of frames with a Token Ring broadcast address as destination.
- **Multicast Frames**
  Number of frames with a Token Ring functional or group address as destination.

Config Loss

The **`Config Loss`** counter shows the number of configuration losses within the current interval. The configuration loss threshold and interval parameters are described in Chapter 3, “Console Configuration”. The **`Config Loss Reason`** can be one of these:

Wire Fault	The port was closed due to a wire fault, perhaps because the cable was removed.
Lobe Test Fail	The lobe test failed during the recovery after a beacon condition.
Heart Beat	The port was closed after a failure of the heartbeat function.

Table 6. Config Loss Values

TXI New Station	The port was closed after receiving a MAC frame with a source address different from the stored Upstream Neighbor address.
TXI Protocol	The port was closed due to a MAC TXI protocol error.
None	The port has never failed.

Table 6. Config Loss Values

Last Reset

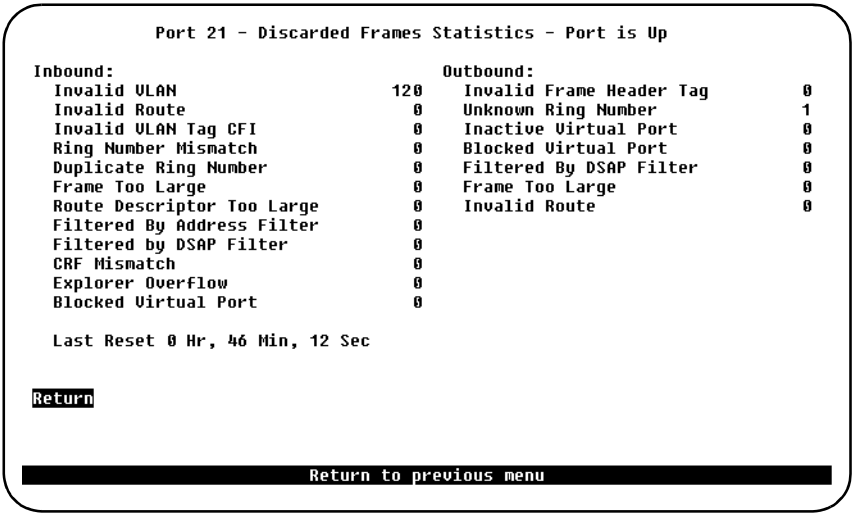
The time since the last reset.

Reset

When **Reset** is chosen, all frame, byte, and discarded frame counters are reset.

Discarded Frames

When **Discarded Frames** is chosen on the general statistics display, the following screen appears:


Port 21 - Discarded Frames Statistics - Port is Up
Inbound:
Invalid VLAN 120
Invalid Route 0
Invalid VLAN Tag CFI 0
Ring Number Mismatch 0
Duplicate Ring Number 0
Frame Too Large 0
Route Descriptor Too Large 0
Filtered By Address Filter 0
Filtered by DSAP Filter 0
CRF Mismatch 0
Explorer Overflow 0
Blocked Virtual Port 0
Last Reset 0 Hr, 46 Min, 12 Sec
Outbound:
Invalid Frame Header Tag 0
Unknown Ring Number 1
Inactive Virtual Port 0
Blocked Virtual Port 0
Filtered By DSAP Filter 0
Frame Too Large 0
Invalid Route 0
Return
Return to previous menu

The screen shows the number of frames discarded on the HSTR port in both inbound (from HSTR) and outbound (to HSTR) directions. The discard reasons are described in the list that follows.

Discarded Inbound Frames

The following discard reasons are defined for inbound frames:

- **Invalid VLAN**
  The frame was received on an unknown VLAN. The frame was either a VLAN tagged frame containing an unknown VLAN ID, or an untagged frame when no untagged virtual ports are defined. Make sure that the 802.1Q VLAN ID and virtual port tagging mode is set to the same value on both sides of the connection.

- **Invalid Route**
  Frame that held invalid Route Information Field (RIF) was received. Possible reasons are, the frame:

  — Had an odd or zero RIF length.

  — Was to small to contain a RIF.

  — Was an explorer frame with a backward RIF.

  — Was a non-explorer frame with a RIF length of 4.

- **Invalid VLAN Tag CFI**
  A VLAN tagged frame had an invalid Canonical Format Indicator (CFI). The CFI is a bit in the Tag Control Information field of a VLAN tag. This bit indicates the bit order of any MAC addresses in the information field. It is 0 for Ethernet format and 1 for Token Ring format. It should thus always be 1 in received frames.

- **Ring Number Mismatch**
  A frame was discarded for one of two reasons

  — In an explorer frame, the RIF length was larger than 2 and the ring number of the HSTR port was not the last ring number in the RIF.

  — In a non-explorer source-routed frame, the HSTR port ring number was not in the RIF.

- **Duplicate Ring Number**
  A source-routed frame was discarded because it contained the HSTR port ring number more than once. This could indicate a loop in the spanning tree.

- **Frame Too Large**
  The frame was larger than the maximum frame size, configured for the virtual port. Refer to the table of maximum frame sizes in the description of virtual-port configuration.

- **Route Descriptor Too Large**
  An explorer frame had a RIF length that would exceed the configured maximum hop count limit if more hops were added. The frame therefore was forwarded only to the other ports in the same CRF as the receiving virtual port.
- **Filtered By Address Filter**
  A frame was discarded because of a MAC address filter.
- **Filtered By DSAP Filter**
  A frame was discarded because of a protocol (DSAP or protocol type) filter.
- **CRF Mismatch**
  A frame was discarded because the destination MAC address or destination source-route hop was registered as local for the virtual port. That is, the frame would have to be forwarded back to same port. This might be due to an error in the configured HSTR VLAN ID for one or more VLANs.
- **Explorer Overflow**
  An explorer frame was discarded because the explorer throttle limit had been exceeded.
- **Blocked Virtual Port**
  The virtual port was currently not in forwarding state. The blocked state may have been permanent (because the spanning tree protocol has detected multiple parallel paths) or transient (during network topology changes).

Discarded Outbound Frames

The following discard reasons are defined for outbound frames:

- **Invalid Frame Header Tag**
  The frame had an invalid internal frame header tag (note that this internal frame header tag is not the same as the VLAN tag).
- **Unknown Ring Number**
  An explorer frame was discarded because one or two ring numbers are required for the RIF expansion and at least one of the required ring numbers was unknown. The ring number must either be configured for the CRF or learned from an incoming explorer frame.
- **Inactive Virtual Port**
  The virtual port was disabled.
- **Blocked Virtual Port**
  The virtual port was not in forwarding state. The blocked state may have been permanent (because the spanning tree protocol detected multiple parallel paths) or transient (during network topology changes).
- **Filtered By DSAP Filter**
  A frame was discarded because of a protocol (DSAP or protocol type) filter.

- **Frame Too Large**
  The frame was larger than the maximum frame size configured for the virtual port. Refer to the table of maximum frame sizes in “Virtual Port Configuration” on page 18.
- **Invalid Route**
  An explorer frame was not transmitted because the ring number of the HSTR port appears earlier than the last ring number in the RIF.

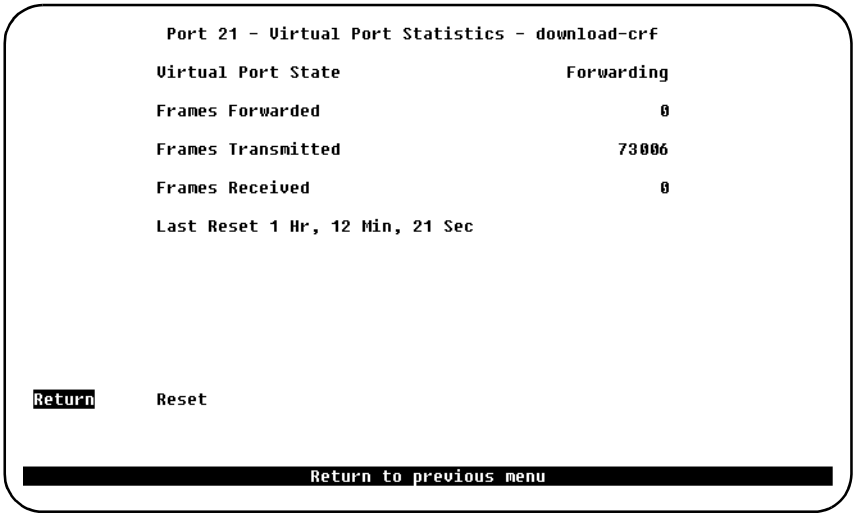
For the following error conditions, transmission is aborted:

- Unknown Ring Number
- Frame Too Large
- Invalid Route

This is because transmission has already begun at the time the error condition is detected. The receiver on the other end will therefore count these frames as RX aborts.

Virtual Port Statistics

When **`Virtual Port Statistics`** is selected from the **HSTR `Port Statistics`** menu for an HSTR port, following screen appears for the selected port:



The following items are displayed:

Virtual Port State

The state of the virtual port. Refer to “Virtual Port Configuration” on page 18 for details.

Frames Forwarded

The number of LLC frames received and forwarded on this virtual port.

Frames Transmitted

The number of LLC frames transmitted on this virtual port.

Frames Received

The number of LLC frames received, but not necessarily forwarded, on this virtual port.

Last Reset

The time since these counters were last reset

Reset

Select **`Reset`** to reset the counters on this screen.

802.5 Statistics

When **`802.5 Statistics`** is selected from the HSTR **`Port Statistics`** menu, information about the Token Ring MAC layer protocol is displayed.

The information on this menu is similar to that for ordinary Token Ring ports. Refer to the *SmartStack STS16-20RM Token Ring Switch Installation and User Guide* for details.

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5. Getting in Touch with Technical Support

For additional support related to this device or document, contact Cabletron Systems using one of the following methods:

World Wide Web	http://www.cabletron.com/
Phone	(603) 332-9400
Internet mail	support@cabletron.com
FTP Login Password	ftp://ftp.cabletron.com/ *anonymous* *your email address*
To send comments or suggestions concerning this document, contact the Cabletron Systems Technical Writing Department via the following email address: **TechWriting@cabletron.com** *Make sure to include the document Part Number in the email message.*	

Before calling Cabletron Systems, have the following information ready:

- Your Cabletron Systems service contract number
- A description of the failure
- A description of any action(s) already taken to resolve the problem (e.g., changing mode switches, rebooting the unit, etc.)
- The serial and revision numbers of all involved Cabletron Systems products in the network
- A description of your network environment (layout, cable type, etc.)
- Network load and frame size at the time of trouble (if known)
- The device history (i.e., have you returned the device before, is this a recurring problem, etc.)
- Any previous Return Material Authorization (RMA) numbers

Problem Report Form

Fill in both sides of this Problem Report Form, print out the relevant system configuration files and fax or mail to Cabletron Technical Support.

Switch Information	
Switch type:	
Hardware revision:	
Software version:	
Switch Configuration	
Port configuration:	
Adapter Information	
Adapter type:	
Operating system:	
Network OS:	
Driver name:	
Driver version:	

Company: _____ Name: _____

Address: _____

Country: _____ Phone/Fax: _____

E-mail: _____

Problem Description

Network Installation Sketch

Appendix A. Abbreviations

AC	Access Control
ARE	All-Routes Explorer
ATM	Asynchronous Transfer Mode
BRF	Bridge Relay Function
CFI	Canonical Format Indicator
CRC	Cyclic Redundancy Check
CRF	Concentrator Relay Function
DA	Destination Address
DSAP	Destination SAP
DTR	Dedicated Token Ring
ECO	Engineering Check Order
FC	Frame Control
FCS	Frame Check Sequence
FDX	Full Duplex
HDX	Half Duplex
HSTR	High-Speed Token Ring
IP	Internet Protocol
LAN	Local Area Network
LED	Light Emitting Diode
LLC	Logical Link Control
MAC	Media Access Control
Mbps	MegaBit Per Second
MMF	Multi Mode Fiber
MTU	Maximum Transmission Unit
NSR	Non-Source Routed
NVRAM	Non-Volatile RAM
RAM	Random Access Memory

RIF	Route Information Field
RX	Receive Data
SA	Source Address
SAP	Service Access Point
SNMP	Simple Network Management Protocol
SR	Source Routing
SRB	Source Route Bridging
SRF	Specifically Routed Frame
SRS	Source Route Switching
SRT	Source Route Transparent
SSAP	Source SAP
SSIM	SmartStack Interface Module
STE	Spanning Tree Explorer
TCI	Tag Control Information
TFTP	Trivial File Transfer Protocol
TR	Token Ring
TX	Transmit Data
TXI	Transmit Immediate
UTP	Unshielded Twisted Pair
VLAN	Virtual LAN

❑

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